

## Assignment #13

Due on Monday, October 24, 2011

**Read** Section 4.6 on *Integration Technique*, pp. 172–178, in *Essential Calculus with Applications* by Richard A. Silverman.

**Read** Section 4.8.4, *Integration by Parts*, in the class lecture notes at <http://pages.pomona.edu/~ajr04747/>, starting on page 60.

**Read** Section 4.8.5, *Integrating Factors*, in the class lecture notes at <http://pages.pomona.edu/~ajr04747/>, starting on page 61.

**Do** the following problems

1. Use the method of integrating factor discussed in Section 4.8.5 in the class lecture notes to find the general solution to the linear, first order differential equation with constant coefficients

$$\frac{dy}{dt} = ay + b, \quad (1)$$

where  $a$  and  $b$  are constant with  $a \neq 0$ .

Compare your result to what you obtain when you solve (1) via separation of variables.

2. Use the method of integrating factor discussed in Section 4.8.5 to find the general solution to the linear, first order differential equation

$$\frac{dy}{dt} = 2ty + t.$$

3. Find the general solution to the linear, first order differential equation

$$\frac{dy}{dt} = y + e^{2t}.$$

4. Find the general solution to the linear, first order differential equation

$$\frac{dy}{dt} = -\frac{1}{2t}y + t, \quad \text{for } t > 0.$$

5. Solve the initial value problem

$$\frac{dy}{dt} = -\frac{1}{2t}y + t, \quad \text{for } t > 0, \quad y(1) = 0.$$